

In the Claims:

Claims 1-9 (Cancel).

Claim 10 (Original): A method of processing a metal casting, comprising:
providing a mold with a casting core;
pre-heating the die to a temperature sufficient to at least partially heat treat
the metal of the casting;
pouring the metal into the mold to form the casting having a core and a
series of core openings defined therein;
at least partially heat treating the metal of the castings in the mold; and
removing the core from the casting.

Claim 11 (Original): The method of claim 10 and wherein at least partially heat treating the
metal in the mold comprises introducing a heated fluid media into the
mold.

Claim 12 (Original): The method of claim 11 and further comprising cooling the mold and
casting after pouring the metal in the mold to solidify the casting in the
mold prior to heat treating.

Claim 13 (Original): The method of claim 10 and further comprising:
removing the casting from the mold;
positioning the casting at a first position so that x, y and z axes of the
casting oriented in a known first orientation with a series of the
core openings in alignment with a first plurality of nozzles; and
applying heat to the casting with the first plurality of nozzles to at least
partially dislodge the core from the casting.

Claim 14 (Original): The method of claim 13 and further comprising:
positioning the casting at a second position with x, y and z axes of the
casting oriented in a known second orientation, different from said
first orientation and with at least a series of core openings in
alignment with a second plurality of nozzles; and
applying heat to the casting with the second plurality of nozzles.

Claim 15 (Original): The method of claim 10, and wherein at least partially heat treating the
casting comprises:
maintaining the mold and casting at a known position;
moving a plurality of nozzles to a first nozzle position about the mold;
applying heat to the mold with the nozzles to at least partially heat treat
and dislodge the core from the casting;
moving at least a portion of the plurality of nozzles to a second nozzle
position; and
further applying heat to the mold with the nozzles in their second nozzle
position to further heat treat the casting within the mold.

Claim 16 (Original): The method of claim 10 and wherein the metal of the casting includes
aluminum and the pre-heating step comprises pre-heating the mold to a
temperature in the range of 400 - 600°.

Claim 17 (Original): The method of claim 10 and wherein applying energy to the mold
comprises directing radiant energy against the mold which absorbs the
radiant energy, and heating the mold and casting from outside the mold,
inwardly.

Claim 18 (Original): The method of claim 10 and wherein applying energy to the mold
comprises directing inductive energy from an induction energy source
against the mold to heat the molds and casting from inside out.

Claim 19 (Original): The method of claim 10 and wherein applying energy to mold comprises moving the mold through a pressurized chamber, drawing a flow of oxygen gas through the mold to promote combustion of a combustible binder material of the mold, and heating the casting with the combustion of the binder and oxygen gas.

Claim 20 (Original): The method of claim 15 and wherein the casting core is formed from sand, and further comprising reclaiming the sand of the core with the removal of the core from the casting.

Claim 21 (Original): The method of claim 10 and further comprising quenching the casting.

Claim 22 (Original): The method of claim 11 and further comprising transferring the mold to a heat treatment line, arresting cooling of the metal within the mold, maintaining the metal within the mold at a above a process control temperature, and thereafter moving the mold into the heat treatment station.

Claims 23-29 (Cancel)

Claim 30 (Original) A system for manufacturing of metal castings, comprising:
a mold in which a metal material is received for forming the casting
therewithin;
a heat treatment station including at least one heat treatment chamber in
which said mold is subjected to application of energy for at least
partially heat treating the casting within the mold; and
wherein said at least one heat treatment chamber includes a heat source for
heating said mold to a temperature sufficient to at least partially
heat treat the casting therewithin.

Claim 31 (Original): The system of claim 30 wherein said heat source comprises at least one nozzle station positioned along said heat treatment chamber and having at least one nozzle station positioned along said heat treatment chamber and having at least one nozzle initially mounted in alignment with a series of openings formed in said mold for applying a fluid media to said mold for heating said mold and dislodging core material of a core within the casting.

Claim 32 (Original): The system of claim 30 and wherein said heat source comprises a radiant energy source mounted in said heating chamber so as to direct radiant energy toward said mold, which radiant energy is absorbed by said mold, for heating said mold and the casting therewithin.

Claim 33 (Original): The system of claim 30 and wherein said heat source comprises an induction energy source mounted within said heating chamber for transmitting inductive energy toward said mold, which inductive energy is absorbed by said mold for heating the casting within said mold.

Claim 34 (Original): The system of claim 30 and wherein said at least one heat treatment chamber comprises a pressurized chamber positioned along said heat treatment station for drawing a flow of oxygen gas through said molds for reacting and combusting with a binder material, in order to at least partially heat treat the castings within said mold as the binder material and oxygen gas are combusted.

Claim 35 (Original): The system of claim 30 and further comprising a quenching station for quenching the heat treated castings.

Claims 36-37 (Cancel).

- Claim 38 (New): A method of processing a metal casting, comprising:
providing a mold;
pouring a molten metal material into the mold;
controlling temperature of the mold to control cooling of the metal in the
mold;
arresting the cooling of the metal in the mold; and
quenching the casting.
- Claim 39 (New): The method of claim 38 and wherein quenching the casting comprises
applying water to the casting.
- Claim 40 (New): The method of claim 38 and wherein quenching the casting comprises
applying air to the casting.
- Claim 41 (New): The method of claim 38 and wherein quenching the casting comprises
applying water to the casting followed by applying air to the casting and
removing the mold.
- Claim 42 (New): The method of claim 38 and further comprising at least partially heat
treating the metal of the casting in the mold.
- Claim 43 (New): The method of claim 38 The method of claim 38 and further comprising
removing the mold from the casting.
- Claim 44 (New): The method of claim 38 and further comprising pre-heating the mold to a
temperature sufficient to at least partially heat treat the metal of the
casting.

- Claim 45 (New): The method of claim 38 and further comprising transferring the casting to a heat treatment station and heat treating the casting prior to quenching the casting.
- Claim 46 (New): A method of forming a metal casting, comprising:
pouring a molten metal material into a mold;
monitoring temperature of the mold and controlling the cooling rates of
the metal during solidification of the molten metal within the mold;
transferring the mold with the casting therein to a heat treatment station to
at least partially heat treat the casting; and
quenching the casting.
- Claim 47 (New): The method of claim 46 and wherein quenching the casting comprises applying water to the casting.
- Claim 48 (New): The method of claim 46 and wherein quenching the casting comprises applying air to the casting.
- Claim 49 (New): The method of claim 46 and further comprising pre-heating the mold to a temperature sufficient to at least partially heat treat the metal of the casting in the mold.
- Claim 50 (New): The method of claim 46 and further comprising removing the casting from the mold.
- Claim 51 (New): A method of processing a casting, comprising:
pouring a molten metal into a mold;
controlling cooling rates of the metal to control solidification of the metal
of the casting within the mold;
arresting cooling of the metal;

transferring the casting to a quench station; and
quenching the casting.

Claim 52 (New): The method of claim 51 and further comprising at least partially heat treating the metal of the casting in the mold.

Claim 53 (New): The method of claim 51 and wherein quenching the casting comprises applying water to the casting.

Claim 54 (New): The method of claim 51 and wherein quenching the casting comprises applying water to the casting followed by applying air to the casting and removing the mold.

Claim 55 (New): The method of claim 51 and further comprising removing the casting from the mold.

Claim 56 (New): A method of forming a metal casting, comprising:
providing a mold;
pouring a molten metal material into the mold to form the casting;
controlling solidification of the molten metal in the mold by controlling
temperature of the mold; and
quenching the casting.

Claim 57 (New): The method of claim 56 and wherein quenching the casting comprises applying water to the casting followed by applying air to the casting and removing the mold.

Claim 58 (New): The method of claim 56 and further comprising removing the casting from the mold.

- Claim 59 (New): The method of claim 56 and further comprising heat treating and removing the mold from the casting.
- Claim 60 (New): The method of claim 56 and further comprising at least partially heat treating the metal of the casting in the mold.
- Claim 61 (New): The method of claim 56 and further comprising decorating the casting.
- Claim 62 (New): A method of processing a metal casting comprising:
pouring a molten metal into a mold to form the casting at a pouring station;
controlling cooling rates of the metal within the mold;
transferring the casting from the pouring station to a quench station;
applying a fluid to the casting to quench the casting.
- Claim 63 (New): The method of claim 62 and wherein applying a fluid to the casting comprises directing a flow of water or a combination of air and water against the casting.
- Claim 64 (New): The method of claim 62 and wherein applying a fluid to the casting comprises immersing the casting in a cooling fluid.
- Claim 65 (New): The method of claim 62 and further comprising at least partially heat treating the metal of the casting in the mold.
- Claim 66 (New): The method of claim 62 and further comprising decorating the casting.